Variation and Synonymy in Hypselonotus *(Heteroptera: Coreidae)*

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ABSTRACT

In the coreid genus *Hypselonotus* Hahn, 35 specific and varietal names, most in current use, are available. Analysis of chromatic variation reveals that 4 species are complexly varied, and that these 35 names pertain to 9 species here recognized. The following new synonymies are proposed: *H. bitrianguliger* Berg 1892 (=var. *mendax* Horváth 1913); *H. fulvus* (De Geer) 1773 (=*lanceolatus* Walker 1871 and var. *gentilis* Horváth 1913); *H. interruptus* Hahn 1833 (=*atratus* Distant 1881, *balteatus* Horváth 1892, *andinus* Breddin 1901, var. *hilaris* Horváth 1913, and *aberrans* Horváth 1913); *H. linea* (Fabricius) 1803 (=*proximus* Distant 1881, *loratus* Breddin 1901, *fuscus* Osborn 1904, var. *procerus* Horváth 1913, *pedestris* Horváth 1913, *simulans* Horváth 1913, and *aequatorialis* Horváth 1913); and *H. lineatus* Stål 1862 (=*intermedius* Distant 1881, var. *neglectus* Horváth 1913, and var. *detersus* Horváth 1913). *Hypselonotus lineatus* Stål and *H. punctiventris* Stål are removed from synonymy with *H. fulvus* (De Geer) and reinstated as recognized species.

In order to provide the correct names of Costa Rican species of *Hypselonotus* in ecological studies by L. A. Real and D. H. Janzen, University of Michigan, I found it necessary to do a short study of chromatic variation to determine which of some 35 available names merit recognition and which pertain to phenotypic and geographic variants. The most recent comprehensive treatment of the genus was by Horváth (1913). His treatment is in general clear and easy to interpret, except that some forms were not available to him. I accept his work as reliable, since it is likely that he had access to type material. Despite his careful treatment, however, I think his interpretation of species much too narrow; thus, I treat as synonyms many names considered by Horváth to represent full species. I do not recognize sympatric varietal names; and I do not recognize subspecies since, at least at present, few if any can be adequately defended as geographic entities.

Various names proposed by Walker (1871) were not treated by Horváth, who probably regarded them as not congeneric with *Hypselonotus*; as judged from original descriptions, these excluded names are not conspecific with forms treated here. Other names not treated by Horváth are *linea* Fabricius, *thoracicus* Signoret, and *fuscus* Osborn. Types of these were not examined, but I think they are readily identifiable from original and subsequent descriptions.

In this study, based on material in the United States National Museum of Natural History (USNM), I attempted to

1. Femora armed with paired subapical ventral teeth 2
   Femora unarmed 5

2(1). Femora with two rows of fine denticles before subapical teeth; corium wholly red ..... *bitrianguliger* Berg
   Femora without distinct denticles before subapical teeth; corium wholly black or black with yellow maculation 3

3(2). Corium wholly black ..... *thoracicus* Signoret
   Corium with yellow maculation 4

4(3). Dorsum black except for bold yellow stripe along midline of pronotum, scutellum, claval suture, and interior margin of corium ..... *linea* (Fabricius)
   Dorsum black except for yellow external margin on pronotum and elytron ... . *tricolor* Breddin

5(1). Femora distinctly annulated with dark spots or bands 6
   Femora unicolorous ..... *interruptus* Hahn

6(5). Rostrum with three distal segments black 7
   Rostrum with three distal segments pale, or diffusely infuscated or with one or two black segments in some South American specimens 8

7(6). Abdomen without spots, or with median row of spots only ..... *lineatus* Stål
   Abdomen with five rows of spots ..... *subterpunctatus* Amyot & Serville

8(6). Abdomen with four or five rows of spots ..... *punctiventris* Stål
   Abdomen without spots ..... *fulvus* (De Geer)

determine how geographic samples are related and thus how to treat the available names. My procedure was to organize material geographically and to search for geographically and chromatically intermediate forms. Sympatric chromatic forms are treated as distinct if independently varied, or as phenotypic variants if not independently varied.

Hypselonotus bitrianguliger Berg

Hypselonotus bitrianguliger Berg 1892: 101.
Hypselonotus bitrianguliger var. *mendax* Horváth 1913: 372. *New synonymy.*

This species differs from all others by having the undersurfaces of the femora biserrulate as well as apically bidentate. I regard the 2 named forms as minor color varieties. Horváth (1913) reported specimens of both forms from "Rio Grande do Sul," Brazil. Among material examined, specimens with the pronotal markings weakly developed (*mendax*) are from Villarrica and "São Paulo." This species is known from northern Argentina, southeastern Brazil, and Paraguay.

Material examined.—BRAZIL. Paraná: Rondon (1). Santa Catarina: Nova Teutonia (1). São Paulo: "São Paulo" (4), Sorocaba (1). PARAGUAY. No Locality (3). Guaira: Villarrica (1).

Hypselonotus fulvus (De Geer)

Cimex fulvus De Geer 1773: 341.
Hypselonotus fulvus: Dallas 1852: 464.
Cimex striatulus Fabricius 1775: 721.
Lygaeus striatulus: Fabricius 1794: 161.
Hypselonotus striatulus: Burmeister 1835: 320.
Lygaeus venosus Fabricius 1794: 142.
Hypselonotus venosus: Stål 1868: 56.
Hypselonotus fulvus var. *venosus:* Horváth 1913: 369.
Hypselonotus dimidiatus Hahn 1833: 189.
Hypselonotus striatulus var. *dimidiatus:* Horváth 1913: 369.
Hypselonotus lanceolatus Walker 1871: 140. *New synonymy.*
Hypselonotus lanceolatus var. *gentilis* Horváth 1913: 369. *New synonymy.*

These names are based on minor variations in color of beak, pronotum, and corium. There is some geographic basis to this variation, but the forms are not sufficiently constant to merit recognition as subspecies. Variation is particularly complex in western South America. This species is related to *H. lineatus* and *H. punctiventris*, but all specimens are dis-

tinguished from the former by the pale beak and from the latter by complete lack of abdominal maculation.

The corium in most specimens is banded, but in some from Colombia, Venezuela, Trinidad, Brazil, and Peru it is unbanded (*fulvus, lanceolatus, striatulus*). In most banded specimens the band is triangular, but in some from "Colombia," Venezuela (Caracas, Esmeralda), Guyana (Kartabo), Brazil (Manaus, Tefé), Bolivia (Cavinas), and Peru (Iquitos, Pucallpa, Yurimaguas) it is transverse and narrow. In some specimens from Peru, the last 2 or even 3 segments of the rostrum are diffusely darkened (*lanceolatus, gentilis:* Iquitos, "Peru," Pucallpa, Yurimaguas), and in one from Caracas the second segment is black while the other segments are pale.

The pronotum in *lanceolatus* and *gentilis* is strongly vittate and not nigropunctate, in *fulvus* and *venosus* nigropunctate and not strongly vittate, and in *striatulus* and *dimidiatus* neither nigropunctate nor vittate. The distribution of nigropunctate and non-nigropunctate forms is geographic: generally nigropunctate in Panama, Colombia, Venezuela (except Caracas and Esmeralda), Guyana, Surinam, Trinidad, and northern Brazil ("Amazon," Manaus, Pará, Tefé; also one specimen from Rio de Janeiro); non-nigropunctate elsewhere. This distinction is imperfect, and in some nigropunctate specimens the dark punctations are few. In some specimens from Bolivia and Peru (Iquitos, "Peru," Yurimaguas) the pronotum is strongly vittate, in others (Cavinas, Pacallpa, "Peru") faintly vittate, and in another (Chanchamayo) non-vittate. These all have strongly developed preocellar vittae. Others from the same area have the pronotum non-vittate and lack preocellar vittae ("Bolivia," "Peru," Chanchamayo, Coroico, Tingo Maria). Within this area, specimens with the pronotum faintly to strongly vittate all have a narrow corium band while in the other specimens the band is absent, triangular, or has weakly defined apical limits. Elsewhere, the pronotum is faintly vittate in some specimens with the nigropunctate pronotum (some specimens from Brazil and Guyana) and in one with the pronotum non-nigropunctate (Esmeralda). Preocellar vittae are developed in all nigropunctate specimens, but also in some non-nigropunctate specimens from Brazil (Chapada, Nova Teutonia), Bolivia, and Peru.

McAtee (1919) placed *H. punctiventris* as a synonym of *H. fulvus*, but I think these 2 forms deserve recognition at least at subspecies level. I have seen 1 specimen of *fulvus* from Belize, and 4 of *punctiventris* from Belize and Guatemala, but have seen none of either from elsewhere in Central America north of Panama. The *fulvus* and *punctiventris* specimens do not intergrade: the *fulvus* specimen lacks pronotal vittae and abdominal spots, and is much smaller.

Material examined.—No locality (7). BELIZE. Toledo: San Antonio (1). PANAMA. Canal Zone: Bobio (3), Juan Mina (1), Tabernilla (1). Panamá: Colón (4), Panamá (1). COLOMBIA. No locality (1). Antioquia: Medellín (3). Córdoba: San Jerónimo (1). Cundinamarca: El Colegio (2). Magdalena: Rio Frio (3). Meta: Villavicenzo (3). Tolima: Armero (2). Valle del Cauca: Cali (2), Palmira (2). VENEZUELA. No locality (5). Esmeralda (1). Miranda (1). Aragua: Maracay (1). Distrito Federal: Caracas (4). Monagas: Quiriquire (2). Yaraguy: San Felipe (1, on "*Sida caprifolia*"). TRINIDAD. No locality (6), Caparo (3), Caranege (1), Caroni River (8), D'Abadie (1), La Brea (1), Maracas Valley (3, on "*Cordia cylindrostachia*"), Palo Seco (1), Port-of-Spain (2), River Estate (1), Saint Augustine (5, on *Cordia* and pigeon peas), San Fernando Hill (1). GUYANA. Blairmont Plantation (2). Demerara: Georgetown (9). Essequibo: Bartica (1), Kartabo (10). SURINAM. Marowijne: Moengo (1). BRAZIL. No locality (1). "Amazon" (1). Amazonas: Manaus (4), Tefé (3). Bahia: Caldeiras (1). Ceará: Ceará (1). Mato Grosso: Chapada (3), Corumba (2), Rio Caraguata (1). Minas Gerais: Sabara (1), Vicosa (1). Pará: Pará (1). Pernambuco:

Bonito (4), Recife (1). Rio de Janeiro: Rio de Janeiro (4). Santa Catarina: Nova Teutonia (13). São Paulo: Campinas (2), Guaituba (1), São Paulo (1). PARAGUAY. Central: Asunción (1), Luque (1). Concepción: 45 mi. e. Horqueta (8). Guaira: Villarrica (1). Paraguari: Sapucay (1). ARGENTINA. Jujuy: Calilegua (1). Misiones: Misiones (1), Posada (1). Tucumán: Tucumán (2). CHILE. Colchagua: Cordillera de los Cipreses (1). BOLIVIA. No locality (4). Beni: Cavinas (1). La Paz: Coroico (3). PERU. No locality (3). Chanchamayo (2). Huánuco: Tingo Maria (3). Loreto: Iquitos (3), Pucallpa (1), Yurimaguas (1).

Hypselonotus interruptus Hahn

Hypselonotus interruptus Hahn 1833: 187.
Hypselonotus bilineatus Westwood 1842: 21.
Hypselonotus concinnus Dallas 1852: 465.
Hypselonotus lineaticollis Stål 1855: 185.
Hypselonotus interruptus var. *lineaticollis:* Horváth 1913: 370.
Hypselonotus propinquus Walker 1871: 142.
Hypselonotus concinnus var. *propinquus:* Horváth 1913: 370.
Jadera subvittata Walker 1871: 145.
Hypselonotus subvittatus: Horváth 1913: 370.
Hypselonotus atratus Distant 1881: 152. *New synonymy.*
Hypselonotus balteatus Horváth 1892: 260. *New synonymy.*
Hypselonotus andinus Breddin 1901: 25. *New synonymy.*
Hypselonotus atratus var. *hilaris* Horváth 1913: 370. *New synonymy.*
Hypselonotus aberrans Horváth 1913: 370. *New synonymy.*

I found no morphological features to distinguish any of these forms, and think they are best treated as 1 geographically varied species. If this treatment is correct, variation is more complex than in other species of the genus. Particularly in South America, 2 or more phenotypes may exist in the same or in nearly proximate localities, with no or incomplete intergradation. However, sufficient intergradation exists to justify treatment of all these forms as conspecific. The following discussion of variation is arranged by geographic area, from north to south.

Specimens from Mexico are *concinnus* or *propinquus*, or intermediates. No geographic differentiation is evident. In all specimens, the head lacks extensive dark maculation on jugum or ocellar tubercles, the pronotum lacks paired white vittae, the scutellum is pale, and the abdomen is unspotted. In *propinquus* the corium is wholly pale and the pronotum is pale except for 2 small basal spots, while in *concinnus* the corium is banded and the pronotum is more extensively darkened but with the midline pale. *Material examined.*—MEXICO. No locality (13). Chiapas (2). Colima: Colima (4). Distrito Federal: Mexico (3), Tacubaya (2). Guerrero: Ixcuinatoyac (1), Rincon (1), Xucumanatlán (1). Morelos: Cuernavaca (4), Hujintlán (2), Tepoztlán (1). Oaxaca: Isthmus of Tehuantepec (1), 44 mi. e. Juchitán (2), Oaxaca (1). Tabasco: Teapa (1). Veracruz: Atoyac (1), Córdoba (6), Jalapa (4), Orizaba (1).

Specimens from Belize, Guatemala, and Honduras are *concinnus*, with the following exceptions. Some specimens from Acatenango and Yepocapa are nearly as pale as in *propinquus*. One of 10 specimens from Punta Gorda is *andinus* (extensive black on jugum and ocellar tubercles, scutellum vittate, pale band of corium narrow, abdomen spotted) and another is an *andinus-concinnus* intermediate (abdomen not spotted). No other Central American specimens have the abdomen spotted. One of the 5 specimens from Chiquimula is a pale *balteatus* (pronotal maculation reduced, with paired white lines on each side; in this specimen the corium is wholly pale and the scutellum dark), and 3 are *atratus* (scutellum black; pronotal collar black at least in part). The *balteatus* specimen is the only pure *balteatus* from Central America. One of 16 specimens from Morales is *atratus*. One of 2 specimens from Trece Aguas is an *atratus-concinnus* intermediate, with scutellum partially darkened and with small black spots on the pronotal collar. *Material examined.*—BELIZE. Uyace Peak (1). Belize: Belize (1). Toledo: Punta Gorda (10). GUATEMALA. No locality (8). Bananera (1). Cayuga (1).

Finca Los Cerritos (1). Alta Verapaz: Trece Aguas (2). Chimaltenango: Acatenango (4), Yepocapa (71). Chiquimula: Chiquimula (5), El Naranjo (3, on *Cinchona*). Guatemala: Guatemala (1). Izabal: Livingston (1), Morales (16), Puerto Barrios (1). Sacatepequez: Antigua (5). Sololá: Olas de Moka (1). HONDURAS. Francisco Morazán: Tegucigalpa (2), Zamorano (1).

One specimen from northwestern Costa Rica (Palo Verde) is *concinnus*. All other specimens from Costa Rica and western Panama are either pure *atratus* or the minor variety *hilaris* (pronotal collar pale). In some, the dark areas of the pronotum and scutellum are divided by a fine pale line visible only under magnification. This form is known also from Guatemala where it intergrades with *concinnus*, and from central Panama where it intergrades with both *concinnus* and *balteatus*. *Material examined.*—COSTA RICA. Guacimo (1). Navarro Farm (2). Cartago: 3 mi. w Turrialba (1), Volcan Irazú (2). Guanacaste: Bagaces (Palo Verde) (1), Pozo Azul (3). Puntarenas: Monteverde (1). San José: Candelarita (1), Escazú (6), San Carlos (3), San Jose (11), Santiago Puriscal (2). PANAMA. Chiriquí: Boquete (13).

Specimens from central and eastern Panama are mostly pure *concinnus* or intermediates, but some pure *atratus* and *balteatus* are represented. Some specimens from Colombia are *concinnus* or *balteatus-concinnus*, some are *balteatus*, and one (Rio Dagua) is *andinus-concinnus*. All specimens from Venezuela are *balteatus*. In series of *balteatus* from Rio Frio and Los Teques, the corium is banded in some specimens and wholly pale in others. In some specimens of various phenotypes from Colombia and Venezuela the pale band of the corium is narrow. One specimen from Trinidad is *balteatus-concinnus*. *Material examined.*—PANAMA. No locality (1). Canal Zone: Ancon (3), Barro Colorado (1), Bobio (1), Cabima (21), Corazal (1), Las Cruces (1), Limon (3), Pedregal (1), Summit (7). Darién: Sabanas (1). Panamá: Taboga Island (5). COLOMBIA. No locality (1). Antioquia: Medellín (8). Caldas: Chinchina (2). Cundinamarca: Bogotá (4), El Colegio (1). Magdalena: Rio Frio (11). Meta: Rio Meta (1). Narino: Pasto (1). Santander: Cararé (2), Landazuri (3). Valle del Cauca: Cali (3), Rio Dagua (1). VENEZUELA. Amazonas: Culebra (1). Aragua: Rancho Grande (1). Miranda: Los Teques (14, on "*Coffea arabica*"). TRINIDAD. Port-of-Spain (1).

Specimens from Bolivia (Christal-Mayu), Brazil, Paraguay, and Argentina have a distinct white annulation at the base of antennal article three, and have the corium banded (*interruptus*), wholly pale (*lineaticollis*), or intermediate. These specimens otherwise have the characteristics of *balteatus*. In northern Brazil ("Amazon"), specimens are obviously intermediate in that the antennal annulation is narrowed. *Material examined.*—BOLIVIA. No locality (2). Cochabamba: Christal-Mayu (1). BRAZIL. No locality (5). "Amazon" (2). Alto de Sera (1). Distrito Federal: Jacaré pagua (1). Mato Grosso: Campo Grande (1), Chapada (5), Ouro Preto (4), Rio Caraguata (1). Minas Gerais: Vicosa (1). Paraná: Curitiba (1). Pernambuco: Bonito (1). Rio de Janeiro: Bico do Papagaio (1), Nova Friburgo (3), Rio de Janeiro (4), Teresopolis (5). Rio Grande do Sul: Porto Alegre (1). Santa Catarina: Nova Teutonia (38). São Paulo: Campinas (3), Guaituba (5), Maua (2), São Paulo (6). PARAGUAY. No locality (1). Guaira: Villarrica (6). Paraguari: Sapucay (25). ARGENTINA. Puesta (1). Misiones: Ignacio (1). Salta: Salta (1). Tucumán: Tucumán (1).

In specimens from Ecuador, Peru, and Bolivia (except Christal-Mayu) there are 3 types of abdominal maculation: 7 rows of spots (*aberrans*: "Bolivia", 1; Carabaya, 1; Ivon, 1; Ixiamus, 1; Rio Blanca, 7; Rurrenabaque, 1; Santa Isabel, 3; Tumupasa, 4); 2 or 4 rows of spots (*andinus*: Cachabi, 7; Chimbo, 1; Pallatango, 2; Quevedo, 3; Rio Pescado, 7; Santa Rosa, 1); and no spots (unnamed: "Bolivia," 4; Ixiamas, 3; Rio Chapare, 1; Rurrenabaque, 3; Tumupasa, 17). In

specimens from Ecuador and Peru (Rio Chapare) the pale band of the corium is narrower than in specimens from Bolivia, indicating relationship with Colombian specimens. In most specimens with the abdomen spotted the pronotum is extensively maculated and has dark lateral margins, but the pronotal maculation is reduced in some Ecuadorian specimens with abdominal spots (Chimbo, Pallatango, Quevedo, Rio Pescado, Santa Rosa) and is strongly developed in some specimens without abdominal spots (Rio Chapare, some Bolivian specimens). The scutellum is wholly black in some Bolivian specimens with abdomen unspotted but is vittate in all others. There is no significant variation in maculation in series from any of the Ecuador localities. In series from three Bolivia localities, however, spotted and unspotted specimens are represented in each. I regard these color forms as conspecific because in both forms the first segment of the beak has a more strongly developed white annulation than in more northern specimens and because some specimens of each agree in pronotal and scutellar coloration. I also regard them as conspecific with *interruptus* because some specimens have paired white pronotal vittae as in *balteatus* and *interruptus*, because specimens with similar dorsal maculation are known from Colombia and northward, and because some Bolivian specimens have a trace of the antennal annulation characteristic of *interruptus*. *Material examined.*— ECUADOR. Cachabi (7). Rio Blanca (7). Chimborazo: Pallatango (2). El Oro: Santa Rosa (1). Guayas: Chimbo (1). Los Rios: Quevedo (3). Manabi: Rio Pescado (7). PERU. Rio Chapare (1). Cuzco: Santa Isabel (3). Puno: Carabaya (1). BOLIVIA. No locality (5). Beni: Ivon (1), Rurrenabaque (4), Tumupasa (21). La Paz: Ixiamas (4).

In summary, the color variants of *H. interruptus* are essentially geographic phenotypes, with the exceptions of a pale *balteatus* in Guatemala (normally in Colombia and Venezuela) and a Chimbo-like *andinus* in Belize (normally in Ecuador and Peru). Pale and dark forms are sympatric in Mexico (*concinnus*), Colombia and Venezuela (*balteatus*), and Brazil and Paraguay (*interruptus*). Intergrades are known for all geographic variants, but in some areas 2 or more phenotypes may occur with little or no intergradation. Thus, in specimens from Bolivia the abdomen is either conspicuously spotted or is unspotted. The pattern of variation is least understood in western South America; further study is particularly needed in Bolivia, where *interruptus* and *aberrans* occur in adjacent departments with little intergradation.

Hypselonotus linea (Fabricius)

Lygaeus linea Fabricius 1803: 220.
Hypselonotus linea Dallas: 1852: 465.
Hypselonotus proximus Distant 1881: 153. *New synonymy.*
Hypselonotus loratus Breddin 1901: 25. *New synonymy.*
Hypselonotus fuscus Osborn 1904: 199. *New synonymy.*
Hypselonotus loratus var. *procerus* Harváth 1913: 370. *New synonymy.*
Hypselonotus pedestris Horváth 1913: 370. *New synonymy.*
Hypselonotus simulans Horváth 1913: 371. *New synonymy.*
Hypselonotus aequatorialis Horváth 1913: 371. *New synonymy.*

These names pertain to geographic color varieties. There is a complex pattern of variation, too complex to fully resolve here and too complex to permit recognition of subspecies. Horváth (1913) did not recognize *linea* in his material and was not familiar with *fuscus*, but these names are readily recognized from the literature (Distant 1881, Osborn 1904, Horváth 1913).

All specimens from Volcan de Chiriquí and northward (*proximus*) are distinguished from all specimens from central Panama and southward by having the elytral fascia parallel to the corium margin rather than bent away from the lateroapical angle. All specimens from Costa Rica and northward have the upper thoracic pleural spots discrete, while in some specimens from Volcan de Chiriquí and in all specimens from central Panama

and Ecuador these spots are fused. The jugum is partly darkened in some Central American specimens, and preocellar spots are present in some.

No specimens are represented in USNM material between Panama and Ecuador, but no important differences between Central and South American specimens were found. Further, specimens from Panama and Ecuador agree in the form of markings of the thoracic pleura.

Horváth named *aequatorialis* and *simulans* for Ecuadorian and Peruvian specimens with univittate pronota and dilated elytral fasciae. Specimens from Paramba and Cachabi have annulate femora, lack preocellar vittae or jugal markings, and have the upper spots of the thoracic pleura fused (*aequatorialis*). Specimens from Hacienda Maria have dark femora, jugum dark laterally, and discrete pleural spots (*simulans*). Two other specimens have broad elytral fasciae but have trivittate pronota: 1 from Venturia is otherwise as in *aequatorialis*, while 1 from Iquitos has notably wide elytral fasciae and otherwise agrees with *simulans* except for having annulate femora. From remarks by Horváth (1913), I suspect the characteristics of the Iquitos specimen are close to or the same as those of the type of *linea*.

Two forms, *simulans* and *pedestris*, have dark femora. These Peruvian color variants were both reported by Horváth from Marcapata. In *pedestris* the elytral fasciae are not dilated (this difference is slight), the jugum is more extensively though not completely darkened (variable), and the pronotum is trivittate. I examined seven specimens of *pedestris* from Calanga, Rio Chapare, and Tingo Maria.

Horváth distinguished *loratus* and *procerus* from *pedestris* chiefly by the annulate femora, and Osborn's *fuscus* fits here by locality and description. Some but not all specimens have dark preocellar markings, and in most specimens the jugum is wholly dark. This form ranges widely in Bolivia, Brazil, and Peru. The variety *procerus* was distinguished by having quinquevittate rather than trivittate pronota and by having dark rather than pale corium venation. Both pronotal variants are represented in series from Chanchamayo, Ixiamas, and Satipo. Forms with pale venation are known only from Bolivia and Brazil, but in series from Huachi and Ixiamas some specimens are fully dark. In Peru, *procerus* and *pedestris* were both reported by Horváth from Pozuzo.

Material examined.—BELIZE. Toledo: Punta Gorda (1), San Antonio (1). GUATEMALA. Chiquimula: Chiquimula (2). COSTA RICA. "Waldeck" (2, on "*Sida rhombifolia*"). Cartago: Carillo (3), Turrialba (5). Guanacaste: Pozo Azul (6). Limón: Guapiles (4), Parismina (3). San José: San Carlos (1). PANAMA. Canal Zone: Alhajuelo (1), Cabima (1), Rio Trinidad (5). Chiriquí: Volcan de Chiriquí (7). Panamá: Cerro Campana (2), El Valle (5). ECUADOR. Cachabi (2), Paramba (5), Venturia (1). PERU. Chanchamayo (15), Chapare (1). Cuzco: Calanga (3), Hacienda Maria (3). Huánuco: Tingo Maria (2). Junín: Satipo (4). Loreto: Iquitos (1). Pasco: Oxapampa (1). San Martín: Tarapoto (1). BOLIVIA. Beni: Huachi (5), Ivon (1), Rosario (1), Rurrenabaque (13), Tumupasa (7). La Paz: Ixiamas (13). BRAZIL. "Amazon" (1). Minas Gerais: Vicosa (1).

Hypselonotus lineatus Stål

Hypselonotus lineatus Stål 1862: 297.
Hypselonotus intermedius Distant 1881: 151. *New synonymy.*
Hypselonotus lineatus var. *neglectus* Horváth 1913: 369. *New synonymy.*
Hypselonotus lineatus var. *detersus* Horváth 1913: 369. *New synonymy.*
Hypselonotus fulvus: McAtee 1919: 9.

These forms were distinguished for variants in color pattern. They cannot be distinguished consistently, and the geographic pattern is too complex to merit recognition of subspecies. I examined 132 specimens from Mexico, Central America, and northwestern South America. These may be grouped into 5 geographic areas (Fig. 1):

Area 1.—Pacific slope of Mexico

Fig. 1. Distribution and variation of *Hypselonotus lineatus* in Mexico and Central America. See text for description and discussion of color variants in the 5 geographic areas indicated by broken lines.

north of the Isthmus of Tehuantepec. All specimens have six moderate to strong longitudinal pronotal vittae, short preocellar vittae, wide preapical band on corium, and small median spot on one or more of abdominal sterna 3-5. *Material examined.*—MEXICO. Colima: Colima (6). Durango: Presidio (1). Morelos: Cuernavaca (1), Hujintlán (1), Puente de Ixtla (1). Nayarit: San Blas (1). Oaxaca: Puerto Angel (1). Sinaloa: La Concha (1).

Area 2.—Atlantic slope of Mexico. All specimens have 6 strong longitudinal pronotal vittae, long preocellar vittae, and no abdominal spots. In about half of the specimens the preapical band of the corium is narrow, in the other half it is absent. This is true *lineatus*. *Material examined.*—MEXICO. "Mexico" (9). Oaxaca: Tuxtepec (1), Valle Nacional (2). Tamaulipas: Tampico (1). Veracruz: Córdoba (4), San Rafael-Jicaltepec (4). Yucatán: "Yucatán" (1), Chichén Itzá (1), Temax (2).

Area 3.—Isthmus of Tehuantepec to Guatemala. Variation in this area is complex. Some specimens from the Isthmus of Tehuantepec and Belize have pronotal vittae. Some specimens from throughout the area have long preocellar vittae, and/or abdominal spots, and/or wide preapical corium band. These variations are correlated neither with one another nor with sex. The type of *intermedius* is from this area (San Geronimo, Baja Verapaz, Guatemala), and has abdominal spots but lacks pronotal vittae. *Material examined.*—MEXICO. Oaxaca: Almoloya (12), "Isthmus of Tehuantepec" (1), Tolosa (1). BELIZE. Toledo: Punta Gorda (5), San Antonio (2). GUATEMALA. Alta Verapaz: Seganguin (1). Chiquimula: Chiquimula (5). Izabal: Morales (2). Retalhuleu: Champerico (2).

Area 4.—El Salvador to Costa Rica. All specimens lack pronotal vittae and none have long preocellar vittae; elytral and abdominal characters are as in area 3. A series from Piedras Negras (type

locality of *detersus*) includes specimens with the characters of *detersus, neglectus,* and *intermedius*. *Material examined.* —"Volcan Isalco" (1). EL SALVADOR. "El Salvador" (1). Cuscatlán: Rosario (2). La Libertad: San Andres (2). San Salvador: San Salvador (2). Sonsonate: Acajutla (1). HONDURAS. Francisco Morazán: Zamorano (2). NICARAGUA. León: Guadalupana (2). Managua: Managua (1). COSTA RICA. Salinas (1). Alajuela: Orotina (1). Guanacaste: Bagaces (Palo Verde) (5), Santa Rosa (1). San José: Candelarita (2), Piedras Negras (9), San Carlos (1), Santa Ana (1).

Area 5.—Panama and northwestern South America. All specimens lack long preocellar vittae, pronotal vittae, and abdominal spots; eight specimens from Panama have the wide preapical corium band. *Material examined.*—PANAMA. Canal Zone: Barro Colorado Island (2), Cabima (3), Comacho (1), Juan Mina (6), Paraiso (2), Summit (2), Upper Rio Indio (1). Panamá: Panamá (2), Taboga Island (2). Veraguas: Santiago (1). COLOMBIA. Valle del Cauca: Rio Dagua (3). ECUADOR. El Salado (1). PERU. Tequetepeque (2).

Hypselonotus punctiventris Stål

Hypselonotus punctiventris Stål 1862: 297.
Hypselonotus fulvus: McAtee 1919: 9.

Van Duzee (1917) listed 2 species of *Hypselonotus* from the United States: *H. punctiventris* Stål and *H. fulvus* var. *venosus* (Fabricius), the latter a doubtful record from Texas. McAtee (1919) suggested that all names for Nearctic members of the genus are synonymous with *H. fulvus* (De Geer). However, in USNM material there are 3 specimens of true *punctiventris* from Texas and Mexico variously labelled by McAtee as *H. fulvus, H. fulvus* var. *lineatus,* and *H. fulvus* var. *punctiventris*. I conclude that the only Nearctic species is *H. punctiventris*. It is possible that *punctiventris* is conspecific with *fulvus*, but if so it should be treated as a well marked geographic subspecies; *punctiventris* ranges south through Mexico to Belize and Guatemala, where it overlaps but does not intergrade with *fulvus*.

As implied by the lack of names in synonymy, there is little conspicuous variation. The pronotum tends to have the 6 longitudinal vittae less developed in most specimens from Texas and northeastern Mexico than elsewhere. In all specimens preocellar vittae are present, and in all specimens the pale band of the corium is present and triangular.

Material examined.—UNITED STATES. Arizona: Santa Cruz County, near Nogales (1). Texas: No locality (2); Bee County, Beeville (2); Bexar County, San Antonio (8); Cameron County, Brownsville (17, on "*Abutilon hypoleucum*," cotton, and "*Wiesidula holosericea*"); Dimmit County, Asherton (1, on blackeyed pea), Carrizo Springs (3, on blackeyed pea and eggplant); Duval County, San Diego (1); Guadalupe County, Seguin (1); Hidalgo County, Thayer (2, on ragweed); Jim Wells County, Alice (2); Nueces County (4); Victoria County, Victoria (20, on cotton, *Croton*, and flowers). MEXICO. No locality (15). Coahuila: Zaragoza (1). Colima: Colima (8). Distrito Federal (1). Durango: Ventanas (1). Jalisco: Chapala (1), Sayula (1). Morelos: Cuautla (2), Cuernavaca (21, on "*Eupatorium adenophorum*"). Nuevo Leon: Linares (1). Oaxaca: Almoloya (1). Salina Cruz (1), San Geronimo (11), Tehuantepec (1), Tlacolula (1). San Luis Potosí: Tamazunchale (2). Sinaloa: Villa Union (1). Tamaulipas: Ciudad Victoria (4), Matamoros (9, on "*Pseudabutilon lozani*"), Tampico (1). Veracruz: Córdoba (1), Pueblo Viejo (3). Yucatán: Temax (2). BELIZE. Toledo: Punta Gorda (2). GUATEMALA. Chiquimula: Chiquimula (2).

Hypselonotus subterpunctatus Amyot & Serville

Hypselonotus subterpunctatus Amyot & Serville 1843: 242.

I cannot judge the true status of this form. The black beak suggests affinity with *H. lineatus*, but the spotted abdo-

men is distinctive and no intergrades are known. All specimens examined have a wide transverse pale band on the corium.

Material examined—BOLIVIA. Cochabamba: Christal-Mayu (10). La Paz: Ixiamas (1). BRAZIL. Mato Grosso: Rio Caraguata (3). São Paulo: Campinas (1).

Hypselonotus thoracicus Signoret

Hypselonotus thoracicus Signoret 1862: 581.

This is the only described species with wholly black elytra, and was described from Yurimaguas, Peru. I have seen nothing to exactly match the original description. I have seen 1 specimen from Peru with wholly black elytra, but the head is red rather than yellow and the pronotum and abdomen are differently maculated. This specimen is similar also to *H. tricolor* but has the head largely rufous rather than testaceous, pronotum trivittate and with black margins, elytra wholly black, and abdomen densely maculated.

Material examined.—PERU. San Martín: Tarapoto (1).

Hypselonotus tricolor Breddin

Hypselonotus tricolor Breddin 1901: 25.

Specimens of this species are readily distinguished by having the pronotum and elytra black with pale margins. This species was reported by Horváth (1913) from 2 localities in Peru.

Material examined.—No locality (1).

Discussion

Hypselonotus is represented in Mexico and Central America by 5 abundant, widespread species, 3 of which are also abundant and widespread in South America. Of these, *H. fulvus, H. lineatus,* and *H. punctiventris* are closely related. *Hypselonotus lineatus* and *H. punctiventris* are sympatric throughout Mexico and are independently variable, and thus are unquestionably reproductively isolated. *Hypselonotus fulvus* is principally South American but extends through northwestern South America and Central America in sympatry with *H. lineatus* and marginally overlaps *H. punctiventris* in Guatemala. Only 1 specimen of *H. fulvus* was examined from north of Panama and, though I think it unlikely, *H. fulvus* may intergrade with *H. punctiventris*. It is even less likely, but not impossible, that *H. fulvus* and *H. lineatus* may intergrade in western South America, where some specimens of *H. fulvus* have the rostrum darkened and the pale band of the corium narrow.

Four of these widespread species are extremely varied geographically, notably in Central America and western South America. Southern Mexico and Guatemala form the principal area of intergradation of various forms of *H. lineatus*, but even as far south as Costa Rica samples of this species are not uniform. Clinal variation in maculation of pleura and elytra occurs in *H. linea* from Costa Rica to Ecuador, and more complex chromatic variation occurs from Ecuador to Bolivia. Complex chromatic variation, only partly geographic, occurs throughout the range of *H. interruptus* but is most extreme in Central America and from Ecuador to Bolivia. Similar complex chromatic variation occurs in *H. fulvus* in the area between Ecuador and Bolivia. Careful field studies of populations and genetics are needed in these areas.

Four localized South American species are less well known. *Hypselonotus bitrianguliger* is morphologically distinctive, but its color forms need further study. *Hypselonotus thoracicus* and *H. tricolor* are probably distinct from *H. linea* but may not be distinct from each other. *Hypselonotus subterpunctatus* probably is most closely related to *H. lineatus* but probably is not conspecific with that species since no intergrades are known; it is sympatric with *H. fulvus* but differs chromatically and is independently varied.

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